Ecology of Mathematics

A Senior Honors Thesis

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Introduction

With an ever-increasing technological society, mathematical abilities have a critical role in a child's future achievement. An international analysis of mathematical achievement compared children's mathematical ability from three nations: Japan, China, and America. Stevenson, Lee, and Stigler (2008) found that Japanese and Chinese children outperform their American counterparts, on average. Additionally, children in the U.S. are underperforming in math on average when compared to 66 other nations when using the Program for International Student Assessment (PISA) as a measure of cognitive math ability. The U.S. falls behind countries such as the United Kingdom, Thailand, Spain, Netherlands, Norway, Portugal, Greece, Israel, and Australia (Rindermann, 2007). Moreover, within the U.S., many children do not show proficiency in math: a survey reported that 64% of 4th-grade students did not display a proficient level of essential mathematical skills (National Assessment of Educational Progress (2005).

Despite the importance of mathematics, few studies have examined the specific etiological effects influencing mathematics (NAEP, 2005). For one, relatively little is known about the environmental etiologies of mathematics abilities and disabilities (Kovas, Haworth, Petrill, & Plomin 2007). Studies suggest that mathematics is influenced by both genetic and environmental effects. However, math disability has been found to be genetically influenced (Kovas, Haworth, Petrill, & Plomin 2007). But Kovas et al. points out that even if a trait is genetically influenced, environmental influences could still have a major impact on children's mathematics learning (2007).

Current studies examining math abilities have employed twin participants in order to observe shared (those environments that make family members similar) and non-shared environments (those environments that make family members different). Such research has

shown that math abilities are highly heritable, but results are inconsistent. Thompson et al. (1991) observed that 17% of the variance in math could be attributed to genetic effects. In contrast, Light, DeFries, and Olsen found that 69% heritability and 6% shared environmental could be attributed to influences on mathematics abilities (1998). Furthermore, a 2000 study by Alarcon et al. found that math is highly heritable. This study demonstrated that 90% of variation in math performance could be accounted by genetics and 0% of the variance could be attributed to shared environment (Alarcon et al., 2000). However, Alarcon et al. also discussed the need to examine the non-shared environment, the surroundings independent to the child unshared with his twin.

One such level of the non-shared environment is socioeconomic status. Vagi (2008) explored parental socioeconomic status' affect on math abilities of children in kindergarten. Socioeconomic status (SES) was comprised of several indicators: income, parental education, and parental occupation. The composite of these factors displayed the best prediction rather than analyzing one of these factors individually on math. Results showed 14.1% of the variance in math scores of kindergarten children could be attributed to SES. These results are consistent with previous findings suggesting that higher SES is positively correlated mathematical success.

Results from Davis-Kean (2005) suggest that SES affects mathematical abilities in children. She used parents' beliefs, behaviors, and parents' years of schooling as determining factors of SES and she used 2 standardized math achievement tests that are widely used in many other national longitudinal studies (e.g., Western Reserve Reading and Math Project) taken from the Woodcock Johnson's Calculation and Applied Problems achievement tests. Davis-Kean took a composite of these math tests and the Woodcock Johnson reading tests and called this new variable standardized achievement. Then, European non-Hispanic American children's abilities

were compared to African American children's achievements. Results were statistically significant and indicated that higher parental years of schooling have r = .13 with the standardized achievement composite variable in European non-Hispanic American children.

SES is a robust measure of the environment so it is important to study its effects in relation to other environmental measures. Specifically, the effects of SES on cognitive ability have been studied in the context of CHAOS, a measure of organization versus disorganization/chaos in the home. Petrill et al. (2004) found that "chaos within the home was a significant mediator, even when controlling for SES." The combined correlation of chaos and SES accounted for approximately 10% among cognitive skills in children (Petrill et al., 2004).

Emerging research that has assessed the environmental influencers of math abilities has examined the etiology in relation with heritability. Hart et al. (2009) administered specific math achievement tests and sequentially examined them in the context of the genetic and environmental differences. Thompson et al. (1991) studied associations between math and reading ability and found high genetic and shared environmental correlations. Specifically, Thompson et al. (1991) found r = .07 between mathematics abilities and shared family environment. In this same study, the correlations between cognitive ability and school achievement in math were all less than .35 indicating that a child's mathematical performance in school does not necessarily correlate with the child's actual cognitive ability. Common family environments did not influence cognitive abilities, but did significantly influence academic achievement in school. However, Alarcon et al. (1997) insist that a child's success in math is influenced by his school environment, teacher and parental support.

Given the substantial shared environmental influences on math (in addition to genetics), an important next step is identifying the sources of environmental variance. Little is known

about the environmental factors that influence math. What environmental factors are associated with mathematical ability? How strongly correlated are these factors to mathematical success? There is a need to find the relationship of children's school life, family life, and child's exclusive environment on mathematical achievement. Few studies have examined specific environmental variables affecting math attainment.

With respect to environment, the next step should "attempt to identify the specific factors responsible for these influences" (Kovas, Haworth, Petrill, & Plomin 2007). Kovas et al. conducted further research to examine these effects. She has consistently regarded that "an obvious hypothesis that has not yet been rigorously tested is that some monolithic factors such as the family's socioeconomic status or school quality might be responsible for these generalist shared-environmental effects" (Kovas & Plomin). Alarcon et al. found that a child's success in math is influenced by his school environment, teacher, and parental support, even more so than reading (1997). Most research that attempts to identify particular causes of non-shared environment has primarily focused on the family environment rather than the school environment and on personality/behavior problems rather than learning abilities (Kovas & Plomin).

As part of this effort, this research is aimed at examining more detailed family- and school-level environmental measures, geared towards mathematical learning ability. To understand mathematics, and all learning, we must analyze the combination of genetics and environmental factors; understanding all levels leads to a more specific treatment that can be applied through education. Studies that have assessed the environment's affect on children's cognitive abilities have used SES, the family environment, and the school environment. Indicators of SES include highest level of parental education, parental income, and parental

occupation. One of the most statistically significant measures of family environment on cognitive ability is CHAOS, a questionnaire that assesses the confusion and organization in the child's home (Wachs, 2003). Additionally, research suggests that school environment can influence success in math and a teacher administered questionnaire, Teacher Report Form (TRF), asses the child's academic performance and behavioral/emotional problems.

The results of this study could have a positive impact upon the American school setting and teachers will have a more developed understanding of etiologies influencing mathematical capabilities. Based upon the literature, we expect that higher social economic status, as well as positive family and school environments, will be factors that are positively correlated with mathematical success. Given experience with other measures related to reading (Petrill et al., 2005), we expect that these individual measures of the environment will account for roughly ¼ of the shared environmental variance associated with math.

Method

Participants

The participants from the current study are from the longitudinal twin study in Ohio (Case Western, Ohio State, and Cincinnati) titled the Western Reserve Reading and Math Projects (WRRMP). Children were recruited throughout schools in the state. The earliest waves (1-3) focused on early reading skills because these tests were administered when the child entered school. Wave 4 centered on math skills and waves 5 and 6 focused on both reading and math skills. The most current and ongoing wave, year 8, focuses on math skills. The information from this study uses wave 8 data. The average age of a child at testing was 12 years old and 56.6% of the population was female. There were 384 participants in the current wave 8 data. All

of the children had parents who had graduated from high school/had earned the equivalent of their H.S. Diploma and the average parent respondent had graduated from a 4 year college.

Procedure and Measures

Data and questionnaires come from Wave 8. Examiners traveled to each individual's home to conduct tests of achievement for about 120-180 minutes. The questionnaires assessed each child's environment and consisted of the following surveys used in many national longitudinal studies: the Teacher Report Form (TRF), the Bayley Behavior Rating (BBR), the Post-Visit Rating (PVR), and the Child Questionnaire (CQ). The Teacher Report Form (TRF) assesses the classroom and school environment (see Appendix A). The BBR (see Appendix B for examples) examines the child's behavior and willingness to complete mathematical tasks. Two condensed variables were taken from a set of 9-10 to assess the child's emotional ranking and orientation to the examiner. PVR (see Appendix C) is an intense analysis of the home environment by the home-visit tester. Ten variables within the thirty-four questionnaire were used to examine home life. The Child Questionnaire (see Appendix D) is the child's own assessment of his environment and is composed three parts: the child's self reported grades, CHAOS, and school attainment. CHAOS measures the amount of confusion and disorganization in the child's home. The parent's highest reported education level will be used as an indicator of the child's socioeconomic status. The relationships between these 4 questionnaires and SES were measured on three tests of mathematical achievement.

Three subtests of the Woodcock-John III Tests of Achievement were analyzed: Calculation (timed and non-timed computation tests —the best predictor of mathematical intelligence (Hart, Petrill, Thompson, Plomin 2009), Fluency (a three minute computation test of accuracy and speed), and Applied Problems (tests that measure ability to analyze in which

participants must decide which mathematical operation to use and apply it to the calculation). Calculation has a published median reliability of .85, Fluency subtest has a published reliability of .89, and Applied Problems has a published median reliability of .92.

Results

Descriptive Statistics

Table 1 presents the descriptive information for the Woodcock Johnson III Math Measures. The table of standardized scores indicates a range of scores at or near two standard deviations above and below the mean for all three math variables. This sample's average math abilities are slightly higher when compared to the general population.

Pearson Correlations

The purpose of this study is aimed at finding the relationship of the children's school, family, and child's environment on mathematical achievement. To begin, I examined the Pearson correlations of the environmental variables with the Woodcock Johnson Math measures (see Tables 2 through 5). Statistically significant correlations range from r = .11 between the Post Visit tester rating of the mother's yelling and WJ Math Fluency in Table 5 to r = -.48 between the child's self defined math grade and WJ Applied Problems in Table 3. The majority of the remaining comparisons range from r = .16 to r = .30.

This study examines two variables within the Bayley Behavior rating: the child's Emotional/Regulation score and the child's Orientation/Engagement to the examiner (see Table 2). The child's orientation to the examiner is not statistically significantly correlated with any of the three math achievement tests. However, the correlation between the tester's emotional/regulation rating for the child is statistically significantly correlated with WJ Calculation (r = .16) and WJ Applied Problems (r = .17).

Statistically significant correlations were found between the child's assessment of his environment and the WJ math measures. Table 3 lists the correlations between the Child Questionnaire and math achievement tests. Although it is not statistically significant, the child's self assessment of his math grade has the most consistent relationship with WJ Applied Problems with r = -.49. There is not a statistically significant relationship between school activity participation and the Woodcock Johnson subtests, but all other environmental variables on the Child Questionnaire are statistically significantly related to the mathematical tests of achievement (see Table 3).

The Teacher Report Form (TRF) showed a statistically significant correlation with WJ math achievement tests as observed in Table 4. The only statistically significant relationships between teachers' ratings and WJ math achievement tests were the Student Supportiveness Scale, the Formalization Scale, and the Centralization Scale. Statistically significant relationships were found between the Student Supportiveness Scale and WJ Applied Problems with r = .18 and the Student Supportiveness Scale and WJ Calculation with r= .28. The Formalization and the Centralization scales only showed a statistically significant correlation with WJ Math Fluency.

All of the Post Visit ratings (Table 5) showed a statistically significant relationship with at least one of the WJ math measures. The more the mother and father knew child, the enjoyment the parent felt in the parenting role, the parent's warmth, and relationship with child are positively correlated with all three WJ math achievement measures. Although it is not statistically significant, mother's warmth showed the most consistent relationship with WJ Applied Problems with r = .27. The only variable that showed a small magnitude of effect size with WJ math measures is the amount of yelling by the mother and father.

SES, highest level of education achieved by the parent, demonstrated statistically significant relationships with all three math measures. Specifically, WJ Math Fluency and WJ Applied Problems had r = .2 and r = .24 with significant levels less than .01 respectively. WJ Calculation is also positively correlated with SES as shown by r = .12 as depicted in Table 6.

Regression

Regression analyses were conducted in order to see simultaneous predictions of the independent variables and whether they have an independent contribution to the dependent variable. First, we employed exploratory Factor Analysis to reduce the ten PVR variables into a single PVR factor score (Eigen value of 6.40, accounting for 80% of item variance).

Following this manipulation, we conducted a hierarchical multiple regression using the environmental predictors as independent variables and the math outcomes as dependent variables in separate analyses. In Step 1, we entered the CHAOS; in Step 2 we entered the CQ followed by the addition of the TRF in Step 3. In Step 4 we entered the PVR and lastly, we entered SES in Step 5. CHAOS was added first because it demonstrated statistically significant correlations. SES was entered last because it is a more distal measure of the child's environment. We examined the statistical significance of these steps using R^2 change, and present the beta weights of final model (see Tables 7 and 8).

Hierarchical regression analyses are presented in Table 7. Three CQ variables (school attachment, school bonding, and negative attitudes towards school) and three TRF variables (student support, formalization, and centralization) were also condensed into sets. In order to further explore the relationship between the environmental factors, sets of variables were added in steps for multiple regression. Independent variables consisted of the CQ CHAOS, CQ

collapsed variable, TRF collapsed variable, the reduced PVR variable, and SES (parent's highest level of education). These steps were taken in order to look at R^2 change.

When examining the regression of the environmental variables on Calculation, CHAOS and TRF showed statistically significant associations, but the combination of the other three independent variables on Calculation did not result in a significant change in R^2 (see Table 7). For example, the R^2 for CHAOS in Step 1 was .06 and the change in the change in R^2 after added Step 2 did not have a significant change in Calculation (see Table 7). This pattern continued for the other results except when adding TRF in Step 3. This indicates that even though CHAOS and TRF are statistically significantly correlated with Calculation, there is not a large effect size. The only statistically significant F change appeared to be CHAOS and TRF, the first variable and third variable in the model, with an F change of 5.92 and 2.87 respectively. This indicates that CHAOS and TRF have a statistically significant effect on Calculation. In general however, the independent variables showed greater affect on the dependent variable Calculation separately than when combined.

When examining the standardized coefficients, we observe similar results. The beta of CHAOS in Step 1 of the model was -.24 and in Step 4, it was -.16 as demonstrated in Table 8, meaning that after accounting for the relationship of CHAOS with the other environmental variables, one standard deviation change in CHAOS resulted in -.16 change in Calculation. TRF negative attitudes about school and TRF student supportiveness showed statistical significant correlations with Calculation independently than the other variables. After accounting for the relationship with CHAOS, school attachment, and teacher boding, child self reported negative attitudes about school and teacher supportiveness show statistically significant correlations with Calculation as indicated by beta values -.19 for CQ negative attitudes and .27 for TRF

supportiveness. This indicates that a child who has negative feelings about school demonstrates poor performance in Calculation. Additionally, teachers' self reported student supportiveness is linked to enhanced performance in Calculation.

We observed similar results when examining WJ Fluency. CHAOS was statistically significantly correlated with Fluency and its variation was .09 as shown in Table 7. Adding the remaining three independent variables did not appear to account for additional variance. When observing the analysis of variance, we found that CHAOS had an F value of 11.73 with Fluency, but as when we added the other variables, the F value decreased to 3.24 and the results were not statistically significant. The only statistically significant predictor of Fluency was CHAOS (t= -2.69, p=.008, see Table 8) so we could assert that the regression coefficient is not 0. The other seven measures had t values between -1.70 and 1.55 with p values .09 and greater, indicating that the results are not statistically significant. Again, CHAOS is an appropriate factor in determining mathematical ability, specifically in Fluency.

There was a general relationship between Applied Problems and two of the predictor variables. CHAOS showed a statically significant F value of 4.12, but the correlation of CHAOS on Applied Problems had R^2 of only .04 (see Table 7). The variation of Applied Problems that can be explained by CHAOS and TRF is statistically significant and it showed $R^2 = .09$ and F=2.33. When TRF and PVR were added, the results did not have a statistically significant affect on Applied Problems. Unlike the other two math measures, Applied Problems did not show any statistically significant relationship between any of the measures individually. The small t values, ranging from -1.93 and 1.72, and the large p values, ranging from .06 to .86, indicated that none of the predictors were statistically significantly different from 0 (see Table 8). Therefore, our environmental predictors are not appropriate predictors in determining a child's success in

Applied Problems, a test that assesses a child's ability in selecting a mathematical operation and applying it to a math problem.

In general, CHAOS accounted for 8.2% of the variance in Fluency; however, adding the other variables did not yield a significant change in R^2 and the same affect was observed in Applied Problems. Next we examined the beta weights when all independent variables were entered into the model (see Table 8). As expected, TRF student supportiveness showed statistically significant variance (Beta = .72, p = .01) however CHAOS was only marginally significant (Beta = .16, p = .12).

Discussion

The purpose of this study was aimed at examining more detailed family- and school-level environmental measures, geared towards mathematical learning ability. Results indicate that organization in the home is the best predictor of math abilities. Furthermore, the child's self-reported mathematical success in school is also statistically significantly correlated with the child's actual mathematical abilities. A child's socioeconomic status also is a good predictor of mathematical abilities; children from higher SES demonstrate higher levels of math ability. But this relationship was accounted by more proximal measures, in particular, chaos in the home and in some instances, specific indices of the school environment. Based on the results, the environmental level factors are individually associated with math.

Organization in the home (CHAOS) is most consistently statistically significant predictor of math abilities with r = -.48 with Applied Problems (see Table 3). There is a significant correlation between the child's self-reported mathematical success in school and the child's actual mathematical abilities. Furthermore, after completing regression analyses, we observed

that CHAOS accounted for 8.2% of the variance in Fluency; this was the only environmental measure that demonstrated statistical significance in Fluency.

Results also demonstrate that the child's ability to self-regulate and control emotions is positively correlated with mathematical ability as demonstrated by the Bayley Behavior (BBR) Emotional/Regulation composite rating (r = .17 with WJ Applied Problems, r = .16 with WJ Calculation); however, there was not an observable statistically significant correlation of the BBR's Orientation/Engagement rating with any of the math measures and therefore BBR was not included in the full model. These results also demonstrate that certain aspects of school promote specific mathematical abilities. The teacher's level of supportiveness had r = .18 with the child's mathematical performance in Applied Problems and r = .28 with Calculation. Furthermore, in the context of the other environmental measures, the school environment measure (TRF) showed the most environmental variance in Calculation (R^2 change = .075, see Table 7) suggesting that teachers have positive influences on math tests of calculations. All of the Post Visit ratings (Table 5) showed a statistically significant relationship with at least one of the WJ math measures. The more the mother and father knew their child, the enjoyment the parent felt in the parenting role, the parent's warmth, and their relationship with child were positively correlated with all three WJ math achievement measures. SES was also found to be a consistently statistically significant predictor of math abilities (r = .293 with Applied Problems, see Table 6). But on the whole, CHAOS was most commonly statistically significant across the board with all three measures of mathematical ability. This suggests that disorderly home life environment, chaos, contributes to a child's negative mathematical ability.

Overall, 20% of the variance is accounted for by the environmental measures and it is difficult to determine which specific correlations can be attributed to the school versus the home

life environment as observed in the full model (see Table 7). The correlations make it appear to be clearly identified, but in the regression (in the context of other variables) they are not as significant.

Some important limitations and suggested improvements should be made. Further studies should attempt to determine the amount of independence and overlap between reading and math skills. Also, it is noted that there is a difference between math achievement in school and mathematical ability, although the two directly correlate. Additional research is needed to discover the genetic and environmental factors that are independently affecting math achievement and mathematical ability.

Additionally, it is difficult to determine whether specific tests and questionnaires were veridical measures of environmental etiology. There is no way to be certain that the environmental variables that we used were purely environmental; shared family genes are also likely involved. Additionally, the environmental variables in this study are likely not the actual environmental processes that lead to individual differences in mathematical ability, but are more likely markers. Further studies should attempt to determine more specific indicators of mathematical ability. For example, past research has used parental income as the main factor in determining SES instead of parental education. Despite the large sample size, participants of this study were primarily from the same population. The typical child was white (92.8%) with parents who had attended at least some college (91.1%). Diverse demographics could help identify differences of race and socioeconomic status between mathematical abilities.

Despite the limitations of this project, this study showed that SES, CHAOS, account for a significant part of the variance in the Woodcock Johnson math measures. These results are similar to the Hart, Petrill et al. (2007) study that gave evidence that CHAOS is an important

environmental mediator of general cognitive ability. These results suggest that environment plays an important role on a child's mathematical ability. The information from this study has the potential to help parents and teachers better understand the environmental factors influencing child mathematical achievement. Families can help to reduce chaos in the home and hopefully improve their child's mathematical success. Also, along with previous studies, this study demonstrates the importance of determining the environmental mediators that influence mathematical ability.

Table 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CTP: WJ Calculation	324	60	146	101.53	14.557
CTP: WJ Math Fluency	333	68	191	100.67	15.484
CTP: WJ Applied Problems	338	60	134	107.04	11.557

Correlations Between Woodcock Johnson Calculation, Math Fluency, Applied Problems and Environmental Factors

Table 2

	Calculation	Math Fluency	Applied Problems
BBR: Emotional/Regulation	.159*	.064	.165*
BBR: Orientation/Engagement	.072	.064	.081

Table 3

	Calculation	Math Fluency	Applied Problems
CQ: Grades – Math	-.425*	-.355*	-.489*
CQ: CHAOS scale	-.174*	-.131*	-.137*
CQ: School Attachment	.142*	.112	.158*
CQ: Teacher Bonding	.149*	.095	.205*
CQ: Negative Attitude Towards School	-.218*	-.109	-.208*
CQ: School Activity Participation	-.014	.095	.019

Table 4

	Calculation	Math Fluency	Applied Problems
TRF: Affiliation	.017	-.106	-.001
TRF: Student Supportiveness	.279*	.023	.177*
TRF: Professional Interest	.067	-.077	.003
TRF: Achievement Orientation	-.062	.002	.018
TRF: Formalization	.071	.197*	.060
TRF: Centralization	.017	.203*	.030
TRF: Innovativeness	.051	-.102	-.029
TRF: Resource Adequacy	.101	-.123	.112

Table 5

	Calculation	Math Fluency	Applied Problems
PVR: 21. How warm were the observed interactions between the mother and her children?	.261*	.186*	.267*
PVR: 22. How warm were the observed interactions between the father and his children?	.251*	.237*	.242*
PVR: 23. Rate the mothers relationships with her children	.244*	.184*	.215*
PVR: 24. Rate the fathers relationships with his children	.221*	.217*	.146*
PVR: 25. How much did the mother yell or raise her voice with her children?	.060	.112*	.049
PVR: 26. How much did the father yell or raise his voice with his children?	a	a	a
PVR: 27. How well did the mother seem to know her children	.195*	.210*	.235*
PVR: 28. How well did the father seem to know his children	.257*	.250*	.221*
PVR: 29. How much joy did the mother seem to experience in the parenting role?	.236*	.178*	.217*
PVR: 30. How much joy did the father seem to experience in parenting role?	.251*	.188	.200*

Table 6

	Calculation	Math Fluency	Applied Problems
Parental highest education level	.121*	.199*	.239*

Regression Analysis

Table 7

Variable	R Square	F	Significance	R Square Change	F Change	Sig. F Change
Calculation						
CHAOS	.056	5.918	.017	.056	5.918	.017
CQ School	.102	2.747	.033	.046	1.651	.183
TRF	.177	2.891	.009	.075	2.871	.041
PVR	.192	2.754	.009	.014	1.654	.202
SES	.192	2.424	.016	.000	.023	.879
Fluency						
CHAOS	.082	9.317	.003	.082	9.317	.003
CQ School	.103	2.915	.025	.021	.799	.497
TRF	.159	2.651	.015	.056	2.164	.097
PVR	.183	2.721	.009	.024	2.862	.094
SES	.200	2.671	.008	.017	2.039	.157
Applied Problems						
CHAOS	.038	4.108	.045	.038	4.108	.045
CQ School	.085	2.333	.061	.047	1.713	.169
TRF	.113	1.775	.101	.028	1.029	.383
PVR	.119	1.645	.122	.007	.763	.385
SES	.138	1.701	.099	.018	2.013	.159

Standardized Beta Weights for the Full Model

Table 8

Variable	Beta	t	Significance
Calculation			
CHAOS	-.156	-1.552	.124
CQ: School Attachment	.020	.146	.884
CQ: Teacher Bonding	.022	.176	.861
CQ: Negative Attitude Towards School	-.187	-1.708	.091
TRF: Student Supportiveness	.267	2.649	.009
TRF: Formalization	.055	.523	.602
TRF: Centralization	.119	1.087	.280
PVR	.122	1.276	.205
SES	-.016	-.153	.879
Fluency			
CHAOS	-.261	-2.658	.009
CQ: School Attachment	-.106	-.782	.436
CQ: Teacher Bonding	.087	.704	.483
CQ: Negative Attitude Towards School	-.165	-1.572	.119
TRF: Student Supportiveness	-.008	-.077	.939
TRF: Formalization	.183	1.797	.075
TRF: Centralization	.093	.871	.386
PVR	.166	1.768	.080
SES	.141	1.428	.157
Applied Problems			
CHAOS	-.115	-1.131	.261
CQ: School Attachment	-.022	-.157	.875
CQ: Teacher Bonding	.089	.694	.489
CQ: Negative Attitude Towards School	-.183	-1.701	.092

TRF: Student Supportiveness	.142	1.370	.174
TRF: Formalization	.044	.412	.681
TRF: Centralization	.040	.358	.721
PVR	.093	.950	.345
SES	.146	1.419	.159

Appendix A: TRF

Western Reserve Reading Project

Teacher Report Form F/G

Child's Name: **«Child_1_Name» «Childs_Last_Name»**	FID:	SID:	TID:**«Child_1_TRFF_TID»**

1. Today's Date: _____/_____/_____

Month Day Year

2. Child's Grade in School (Please check one):

☐ 2nd Grade ☐ 3rd Grade ☐ 4th Grade ☐ 5th Grade

☐ 6th Grade ☐ 7th Grade ☐ 8th Grade ☐ 9th Grade ☐ Other:_____

3. How well do you know this student?

☐ Not well ☐ Moderately ☐ Very well

4. Approximately how much time does s/he spend in your class per week? _____ hours

5. What subject(s) do you have this student for? (ie. math, language arts, homeroom, etc.)

6. Use the scale below to rate his/her current school performance in the following subjects (please circle):

1	2	3	4	5
Far below grade level	**Somewhat below grade level**	**At grade level**	**Somewhat above grade level**	**Far above grade level**

a.	Reading	1	2	3	4	5
b.	Spelling	1	2	3	4	5
c.	Arithmetic or Math	1	2	3	4	5
d.	Language Arts, Writing	1	2	3	4	5
e.	Science	1	2	3	4	5

7. Compared to students of the same age, please rate this student on the behaviors below using the following scale:

1	2	3	4	5	6	7
Much less	**Somewhat less**	**Slightly less**	**About average**	**Slightly more**	**Somewhat more**	**Much more**

1.	How hard is s/he working?	1	2	3	4	5	6	7
2.	How much is s/he learning?	1	2	3	4	5	6	7

8. How often does this student complete his/her homework?

☐ 1-Almost always
☐ 2-Most of the time
☐ 3-Sometimes
☐ 4-Hardly ever
☐ 5-Never
☐ 99-Not applicable; No homework is given to student.

9. How many total students are in your classroom when «Child_1_Name» is also in the class? _____

10. Use the following scale to rank this student according to standardized assessment parameters commonly used in your school (please circle):

Language Arts	A / Excellent	B / Good	C / Average	D / Below Average	F / Fail
Social Studies	A / Excellent	B / Good	C / Average	D / Below Average	F / Fail
Math	A / Excellent	B / Good	C / Average	D / Below Average	F / Fail
Science	A / Excellent	B / Good	C / Average	D / Below Average	F / Fail

Please rate this student on each of the items listed below according to the following scale (please circle):

0 = Not True (as far as you know)	**1 = Somewhat or Sometimes True**	**2 = Very True or Often True**

Acts too young for his/her age	0	1	2
Hums or makes other odd noises in class	0	1	2
Argues a lot	0	1	2
Fails to finish things s/he starts	0	1	2
Behaves like the opposite sex	0	1	2
Is defiant; talks back to staff	0	1	2
Brags or boasts	0	1	2
Cannot concentrate; cannot pay attention for long	0	1	2
Cannot get his/her mind off certain thoughts; obsesses	0	1	2
Cannot sit still; is restless or hyperactive	0	1	2

Clings to adults or is too dependent	0	1	2
Complains of loneliness	0	1	2
Is confused or seems to be in a fog	0	1	2
Cries a lot	0	1	2
Fidgets	0	1	2
Is cruel, bullying, or mean to others	0	1	2
Daydreams or gets lost in his/her thoughts	0	1	2
Deliberately harms self or attempts suicide	0	1	2
Demands a lot of attention	0	1	2
Destroys his/her own things	0	1	2
Destroys property belonging to others	0	1	2
Has difficulty following directions	0	1	2
Is disobedient at school	0	1	2
Disturbs other pupils	0	1	2
Does not get along with other pupils	0	1	2
Does not seem to feel guilty after misbehaving	0	1	2
Gets jealous easily	0	1	2
Eats or drinks things that are not food	0	1	2
Fears certain animals, situations, or places (not school)	0	1	2
Fears going to school	0	1	2
Fears s/he might think or do something bad	0	1	2
Feels s/he has to be perfect	0	1	2
Feels or complains that no one loves him/her	0	1	2
Feels that others are out to get him/her	0	1	2

Feels worthless or inferior	0	1	2
Gets hurt a lot; is accident-prone	0	1	2
Gets in many fights	0	1	2
Gets teased a lot	0	1	2
Hangs around with others who get in trouble	0	1	2
Hears things that are not there	0	1	2
Is impulsive or acts without thinking	0	1	2
Likes to be alone	0	1	2
Lies or cheats	0	1	2

Please rate this student on each of the items listed below according to the following scale (please circle):

0 = Not True (as far as you know)	**1 = Somewhat or Sometimes True**	**2 = Very True or Often True**

Bites fingernails	0	1	2
Is nervous, high-strung, or tense	0	1	2
Has nervous movements or twitches	0	1	2
Does not conform to rules	0	1	2
Is not liked by other pupils	0	1	2
Has difficulty learning	0	1	2
Is too fearful or anxious	0	1	2
Feels dizzy	0	1	2
Feels too guilty	0	1	2

Talks out of turn	0	1	2
Is overtired	0	1	2
Is overweight	0	1	2
Physical problems without known medical cause:			
a. Aches or pains	0	1	2
b. Headaches	0	1	2
c. Nausea, feels sick	0	1	2
d. Problems with eyes	0	1	2
e. Rashes or other skin problems	0	1	2
f. Stomachaches or cramps	0	1	2
g. Vomiting, throwing up	0	1	2
h. Other:_____	0	1	2
Physically attacks people	0	1	2
Picks nose, skin, or other parts of his/her body	0	1	2
Sleeps in class	0	1	2
Is apathetic or unmotivated	0	1	2
Submits poor school work	0	1	2
Is poorly coordinated or clumsy	0	1	2
Prefers being with OLDER children	0	1	2
Prefers being with YOUNGER children	0	1	2
Refuses to talk	0	1	2
Repeats certain acts over and over; is compulsive	0	1	2
Disrupts class discipline	0	1	2

Screams a lot	0	1	2
Is secretive; keeps things to self	0	1	2
Sees things that are not there	0	1	2
Is self-conscious or easily embarrassed	0	1	2
Submits messy work	0	1	2
Behaves irresponsibly	0	1	2
Shows off or clowns around	0	1	2
Is shy or timid	0	1	2
Has explosive and unpredictable behavior	0	1	2

Please rate this student on each of the items listed below according to the following scale (please circle):

0 = Not True (as far as you know)	**1 = Somewhat or Sometimes True**	**2 = Very True or Often True**

Demands must be met immediately, easily frustrated	0	1	2
Inattentive, easily distracted	0	1	2
Has a speech problem	0	1	2
Stares blankly	0	1	2
Feels hurt when criticized	0	1	2
Steals	0	1	2
Stores up things s/he does not need	0	1	2
Behaves strangely	0	1	2
Has strange ideas	0	1	2

Stubborn, sullen, or irritable	0	1	2
Has sudden changes in mood or feelings	0	1	2
Sulks a lot	0	1	2
Is suspicious	0	1	2
Swears or uses obscene language	0	1	2
Talks about killing self	0	1	2
Is underachieving; not working up to potential	0	1	2
Talks too much	0	1	2
Teases a lot	0	1	2
Has temper tantrums or hot temper	0	1	2
Seems preoccupied with sex	0	1	2
Threatens people	0	1	2
Is tardy to school or class	0	1	2
Is overly concerned with neatness or cleanliness	0	1	2
Fails to carry out assigned tasks	0	1	2
Is truant or has unexplained absences	0	1	2
Is under-active, slow moving, or lacks energy	0	1	2
Is unhappy, sad, or depressed	0	1	2
Is unusually loud	0	1	2
Uses alcohol or drugs	0	1	2
Is overly anxious to please	0	1	2
Dislikes school	0	1	2
Is afraid of making mistakes	0	1	2
Whines	0	1	2

Has an unclean personal appearance	0	1	2
Is withdrawn; does not get involved with others	0	1	2
Worries	0	1	2

Child Rearing and Education

The following are statements about rearing and educating children. Read each statement carefully and ***circle the number*** *that most closely reflects your feelings, using this scale:*

1=strongly DISAGREE	3=neither agree nor disagree	5=strongly AGREE

1 2 3 4 5	Since parents lack special training in education they should not question teachers' training methods.
1 2 3 4 5	Children should be treated the same regardless of the differences among them.
1 2 3 4 5	Children should always obey the teacher.
1 2 3 4 5	Preparing for the future is more important for a child than enjoying today.
1 2 3 4 5	Children will not do the right thing unless they must.
1 2 3 4 5	Children should be allowed to disagree with adults if they feel their own ideas are better.
1 2 3 4 5	Children should be kept busy with work and study at home and at school.
1 2 3 4 5	The major goal of education is to put basic information into the minds of children.
1 2 3 4 5	In order to be fair, a teacher must treat all children alike.
1 2 3 4 5	The most important thing to teach children is absolute obedience to whoever is in authority.
1 2 3 4 5	Children learn best by doing things themselves rather than listening to others.
1 2 3 4 5	Children must be carefully treated early in life or their natural impulses will make them unmanageable.
1 2 3 4 5	Children have a right to their own point of view and should be allowed to express it.
1 2 3 4 5	Children's learning results mainly from being presented with basic information again and again.
1 2 3 4 5	Children like to teach other children.
1 2 3 4 5	The most important thing to teach children is absolute obedience to their parents.
1 2 3 4 5	Once a child is in school, the school has the main responsibility for her or his education.
1 2 3 4 5	Children generally do not do what they should unless someone sees to it.
1 2 3 4 5	I teach children that they should be doing something useful at all times.
1 2 3 4 5	It's all right for a child to disagree with me.
1 2 3 4 5	Children should always obey their parents.
1 2 3 4 5	Teachers need not be concerned with what goes on in a child's home.

1	2	3	4	5	I go along with the game when a child is pretending something.
1	2	3	4	5	Parents should teach their children to have unquestioning loyalty to them.
1	2	3	4	5	Teachers should discipline children all the same.
1	2	3	4	5	Children should not question the authority of their parents.
1	2	3	4	5	What children learn at home is very important to their school success.
1	2	3	4	5	Children will be bad unless they are taught what is right.
1	2	3	4	5	A child's ideas should be seriously considered in making family decisions.
1	2	3	4	5	A teacher has no right to seek information about a child's home background.

What I can do as a teacher

This questionnaire is designed to help us gain a better understanding of things that create difficulties for teachers in their school activities. Please indicate your opinions about each of the statements below by circling the appropriate number.

Nothing	Very Little	Some Influence	Quite A Bit	A Great Deal
1	2-3	4-6	7-8	9

1	How much can you influence the decisions that are made in the school?	1	2	3	4	5	6	7	8	9
2	How much can you express your views freely on important school matters?	1	2	3	4	5	6	7	8	9
3	How much can you do to get the instructional materials and equipment you need?	1	2	3	4	5	6	7	8	9
4	How much can you do to influence the class sizes in your school?	1	2	3	4	5	6	7	8	9
5	How much can you do to get through to the most difficult students?	1	2	3	4	5	6	7	8	9

6	How much can you do to promote learning where there is lack of support from the home?	1	2	3	4	5	6	7	8	9
7	How much can you do to keep students on task on difficult assignments?	1	2	3	4	5	6	7	8	9
8	How much can you do to increase students' memory of what they have been taught on previous lessons?	1	2	3	4	5	6	7	8	9
9	How much can you do to motivate students who show low interest in schoolwork?	1	2	3	4	5	6	7	8	9
10	How much can you do to get students to work together?	1	2	3	4	5	6	7	8	9
11	How much can you do to overcome the influence of adverse community conditions on students' learning?	1	2	3	4	5	6	7	8	9
12	How much can you do to get children to do their homework?	1	2	3	4	5	6	7	8	9
13	How much can you do to get children to follow classroom rules?	1	2	3	4	5	6	7	8	9
14	How much can you do to control disruptive behavior in the classroom?	1	2	3	4	5	6	7	8	9
15	How much can you do to prevent problem behavior on the school grounds?	1	2	3	4	5	6	7	8	9
16	How much can you do to make the school a safe place?	1	2	3	4	5	6	7	8	9
17	How much can you do to make students enjoy coming to school?	1	2	3	4	5	6	7	8	9
18	How much can you do to get students to trust teachers?	1	2	3	4	5	6	7	8	9
19	How much can you do to help other teachers with their teaching skills?	1	2	3	4	5	6	7	8	9
20	How much can you do to enhance the collaboration between teachers and the	1	2	3	4	5	6	7	8	9

	administration to make the school run effectively?								
21	How much can you do to get students to believe they can do well in school work?	1	2	3	4	5	6	7	8	9

School Environment Survey

The following are statements that some teachers make about working at their school. Read each statement and circle the number that corresponds to how well the statement reflects how things are at your school.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. There are many disruptive, difficult students in the school.	5	4	3	2	1
2. I am often supervised to ensure that I follow directions carefully.	5	4	3	2	1
3. Teachers frequently discuss teaching methods and strategies with each other.	5	4	3	2	1
4. It is very difficult to change anything in this school.	5	4	3	2	1
5. The school or department library includes an adequate selection of books and periodicals.	5	4	3	2	1
6. I seldom receive encouragement from colleagues.	5	4	3	2	1
7. I am not expected to conform to a particular teaching style.	5	4	3	2	1
8. Teachers avoid talking with each other about teaching and learning.	5	4	3	2	1

9. Teachers are encouraged to be innovative in this school.	5	4	3	2	1
10. Decisions about running the school are usually made by the principal or a small group of teachers.	5	4	3	2	1
11. The supply of equipment and resources is inadequate.	5	4	3	2	1
12. Most students are helpful and cooperative to teachers.	5	4	3	2	1
13. It is considered very important that I closely follow syllabi and lessons plans.	5	4	3	2	1
14. Professional matters are seldom discussed during staff meetings.	5	4	3	2	1
15. Filmstrips, transparencies, filmloops, and films are readily available and accessible.	5	4	3	2	1
16. I do not feel accepted by other teachers.	5	4	3	2	1
17. At my child's school, it is considered very important for students to do well in external examinations.	5	4	3	2	1
18. Most students are pleasant and friendly to teachers.	5	4	3	2	1
19. There are few rules and regulations that I am expected to follow.	5	4	3	2	1
	Strongly Agree	**Agree**	**Not Sure**	**Disagree**	**Strongly Disagree**
20. There is a great deal of resistance to proposals for curriculum change.	5	4	3	2	1
21. Adequate duplicating facilities and services are available to teachers.	5	4	3	2	1

22. Preparing students for examinations is considered to be my principal task at this school.	5	4	3	2	1
23. There are many noisy, badly-behaved students.	5	4	3	2	1
24. I am allowed to do almost as I please in the classroom.	5	4	3	2	1
25. Many teachers attend inservice and other professional development courses.	5	4	3	2	1
26. I have to refer even small matters to a senior member of staff for a final answer.	5	4	3	2	1
27. Recorders and cassettes are seldom available when needed.	5	4	3	2	1
28. At this school, it is considered very important that students should reach high levels of performance in all their activities.	5	4	3	2	1
29. Students get along well with teachers.	5	4	3	2	1
30. Most teachers like the idea of change.	5	4	3	2	1
31. Action can usually be taken without gaining the approval of the subject department head or a senior member of the staff.	5	4	3	2	1
32. Facilities are inadequate for catering to a variety of classroom activities and different size learning groups.	5	4	3	2	1
33. It is considered very important at my child's school for students to achieve academic success.	5	4	3	2	1

34.My classes are expected to use prescribed textbooks and prescribed resource materials.	5	4	3	2	1
35. New courses or curriculum materials are seldom implemented in the school.	5	4	3	2	1
36. Teachers are frequently asked to participate in decisions concerning administrative policies and procedures.	5	4	3	2	1
37. Projectors for filmstrips, transparencies, filmloops, and films are usually available when needed.	5	4	3	2	1
38. I am ignored by other teachers.	5	4	3	2	1
39. There is a great emphasis on academic achievement at the school.	5	4	3	2	1
	Strongly Agree	**Agree**	**Not Sure**	**Disagree**	**Strongly Disagree**
40. Most students are well-mannered and respectful to the school staff.	5	4	3	2	1
41. Teachers show little interest in what is happening in other schools.	5	4	3	2	1
42. I am encouraged to make decisions without reference to a senior member of the staff.	5	4	3	2	1
43. I feel that I could rely on my colleagues for assistance if he/she should need it.	5	4	3	2	1
44. Students at this school are seldom under pressure to excel at academic work.	5	4	3	2	1
45. Very strict discipline is needed to control many of the students.	5	4	3	2	1
46. Teachers are keen to learn from colleagues.	5	4	3	2	1

47. I must ask my subject department head or a senior member of staff before I do most things.	5	4	3	2	1
48. My colleagues seldom take notice of my professional views and…	5	4	3	2	1
49. Students are pressured to compete at this school.	5	4	3	2	1
50. I am expected to maintain very strict control in the classroom.	5	4	3	2	1
51. Teachers show considerable interest in the professional activities of their colleagues.	5	4	3	2	1
52. There is much experimentation with different teaching approaches.	5	4	3	2	1
53. I have very little say in the running of the school.	5	4	3	2	1
54. I have many friends among my colleagues at this school.	5	4	3	2	1
55. I often feel lonely and left out of things in the staff room.	5	4	3	2	1
56. In most classrooms in the school, students are passive listeners rather than active participants.	5	4	3	2	1

Appendix B: BBR

Staple

Bayley Behavior Rating Items: Kid's name _____

Complete this for the child that you tested.

Your name (please print): _____

A. Positive Affect
1 No positive affect displayed
2 One or two brief displays of positive affect
3 Three or more brief displays of positive affect
4 One or two intense, heightened or prolonged displays of positive affect
5 Three or more intense, heightened or prolonged displays of positive affect

B. Negative affect
1 Three or more intense, heightened or prolonged displays of negative affect
2 One or two intense, heightened or prolonged displays of negative affect
3 Three or more brief displays of negative affect
4 One or two brief displays of negative affect
5 No negative affect displayed

C. Soothability when upset
1 Cannot be soothed
2 Soothed only by being physically comforted (e.g., held, patted)
3 Soothed by being given a desired toy or object
4 Soothed by being spoken to
5 Does not need external assistance to be soothed

D. Hypersensitivity to test materials and stimuli
1 Constantly hypersensitive; hypersensitivity disrupts testing
2 Typically hypersensitive; returns to test activity in one or two instances
3 Occasionally hypersensitive
4 Typically reacts appropriately; hypersensitive in a few instances
5 Constantly reacts appropriately

E. Energy
1 Consistently lacks animation or energy; tired and lackluster
2 Typically tired and lackluster; one or two periods of animation or energy
3 Animated and energetic half the time; tired and lackluster half the time
4 Typically animated or energetic; one or two periods of being tired
5 Consistently animated or energetic

F. Adaptation to change in test materials
1 Consistently resists relinquishing materials and/or refuses to accept new materials
2 Typically resists relinquishing materials and/or refuses to accept new materials; 1 or 2 easy transitions
3 Makes poor transitions half the time; makes good transitions half the time
4 Typically relinquishes materials and accepts new materials; one or two poor transitions
5 Consistently relinquishes materials and accepts new materials

G. Interest in test materials and stimuli
1 No interest
2 One or two displays of interest
3 Moderate interest
4 Much interest
5 Constant interest

H. Initiative with tasks
1 Consistently shows no initiative
2 Typically shows no initiative; one or two instances or initiative
3 Shows initiative half the time
4 Typically shows initiative; one or two instances of no initiative
5 Consistently shows initiative

I. Exploration of Objects and/or surroundings
1 No exploration
2 One or two instances of exploration
3 Moderate exploration
4 Much exploration
5 Constant exploration

J. Attention to tasks
1 Constantly off task; does not attend
2 Typically off task; attends in one or two instances
3 Off task half the time
4 Typically attends; attention wanders in one or two instances
5 Constantly attends

K. Persistence in attempting to complete tasks
1 Consistently lacks persistence
2 Typically not persistent; one or two instances of persistence
3 Lacks persistence half the time
4 Typically persistent; lacks persistence in one or two instances
5 Consistently persistent

L. Enthusiasm towards tasks
1 Consistently unenthusiastic; no particular interest beyond attending to the tasks
2 Typically unenthusiastic; enthusiasm in one or two instances
3 Unenthusiastic half the time
4 Typically enthusiastic; unenthusiastic in one or two instances
5 Consistently enthusiastic

M. Fearfulness
1 Constantly fearful; never trusting
2 Typically fearful; one or two instances of trust
3 Fearful half the time; trusting half the time
4 Typically trusting; one or two instances of fear
5 Constantly trusting; never fearful

N. Frustration with inability to complete tasks
1 Consistently becomes frustrated
2 Typically becomes frustrated
3 Occasionally becomes frustrated
4 Rarely becomes frustrated
5 Never becomes frustrated

O. Orientation to examiner
1 Consistently avoids or resists; never responsive
2 Typically avoids or resists; one or two instances of responsiveness
3 Avoids or resists half the time; responds half the time
4 Typically responds; one or two instances of avoidance or resistance
5 Consistently responds; never avoidant or resistant

P. Social Engagement
1 No attempts to interact socially
2 One or two attempts to interact socially
3 Several attempts to interact socially
4 Many attempts to interact socially
5 Constant attempts to interact socially

Q. Cooperation
1 Consistently resists suggestions or requests
2 Typically resists suggestions or requests; one or two instances of cooperation
3 Resists suggestions or requests half the time; cooperates half the time
4 Typically cooperates; one or two instances of resistance
5 Consistently cooperates

R. Gross-motor movement required by tasks
1 Consistently inappropriate
2 Typically inappropriate; one or two instances of appropriate gross-motor movement
3 Inappropriate half the time; appropriate half the time
4 Typically appropriate; one or two instances of inappropriate gross-motor movement
5 Consistently appropriate

S. Fine-motor movement required by tasks
1 Consistently inappropriate
2 Typically inappropriate; one or two instances of appropriate fine-motor movement
3 Inappropriate half the time; appropriate half the time
4 Typically appropriate; one or two instances of inappropriate fine-motor movement
5 Consistently appropriate

T. Control of movement
1 Consistently clumsy or jerky
2 Typically clumsy or jerky
3 Jerky or clumsy half the time; smooth or coordinated half the time
4 Typically smooth or coordinated
5 Consistently smooth or coordinated

U. Hypotonicity
1 Consistently hypotonic; like a rag doll
2 Typically hypotonic; one or two instances of normal muscle tone
3 Hypotonic half the time; normal muscle tone half the time
4 Typically normal muscle tone; one or two instances of hypotonicity
5 Absence of hypotonicity

V. Hypertonicity
1 Consistently hypertonic; muscles are rigid or tight
2 Typically hypertonic; one or two instances of normal muscle tone
3 Hypertonic half the time; normal muscle tone half the time
4 Typically normal muscle tone; one or two instances of hypertonicity
5 Absence of hypertonicity

W. Tremulousness
1 Constant
2 Frequent
3 Occasional
4 Infrequent
5 None

X. Slow and delayed movements
1 Consistently slow and delayed
2 Typically slow and delayed; one or two instances of movement that has appropriate timing and pacing
3 Slow and delayed half the time; appropriately timed and paced half the time
4 Typically appropriate timing and pacing; one or two instances of slow and delayed movement
5 Consistently appropriate timing and pacing

Y. Frenetic movement
1 Consistently frenetic
2 Typically frenetic; one or two instances of movement that has appropriate timing and pacing
3 Frenetic half the time; appropriately timed and paced half the time
4 Typically appropriate timing and pacing; one or two instances of frenetic movement
5 Consistently appropriate timing and pacing

Z. Hyperactivity
1 Consistently hyperactive; fidgety and agitated in movement
2 Typically hyperactive; one or two instances of appropriate activity level
3 Hyperactive half the time; appropriate activity half the time
4 Typically not hyperactive; one or two instances of hyperactivity
5 Consistently not hyperactive; never fidgety or agitated in movement

Factor Scores:
1. Orientation/Engagement: add scores for: A + E + G + H + I + L + M + O + P = _____
2. Emotional/Regulation: add scores for: B + D + F + J + K + N + O + Q + Y + Z = _____
3. Motor Quality: add scores for: R + S + T + U + V + W + X + Y = _____
4. Additional Items: score for C only: = _____
TOTAL RAW SCORE add scores for all 26 items, A - Z. = _____
(NB: don't just add the factors above, because some items are used twice in them)

Appendix C: PVR

Post-Visit Ratings: Complete these after leaving the home

Your name (please print): _____

1. What type of home does the family live in?
   - 1 subsidized housing (if known)
   - 2 apartment
   - 3 town-house or row-house, or duplex
   - 4 detached house
   - 5 other: _____

2. About how many people live in the home? _____

3. About how many rooms (excluding bathrooms/toilets) does the house have? _____

4. How clean was the inside of the house?

   - 1 Very clean; no bugs, bad smells, clutter, etc.
   - 2
   - 3 Somewhat clean; nothing unhealthy, but some clutter
   - 4
   - 5 Very dirty; many bugs, bad smells, trash, clutter

Indicate which of the following you saw in the house:

	No	Yes
5. Children's books	0	1
6. Age-appropriate toys for the children	0	1
7. Bugs	0	1
8. Uncomfortable heat/cold	0	1
9. Alcohol	0	1
10. Pictures of the family/children	0	1

11. How clean was the area outside of the house?

   - 1 Very clean; no bad smells, trash, etc.
   - 2
   - 3 Somewhat clean; nothing unhealthy, but some trash
   - 4
   - 5 Very dirty; lots of trash, bad smells

Indicate which of the following you saw outside of the house:

	No	Yes
12. Playground	0	1
13. Age-appropriate toys for the children	0	1
14. Broken glass	0	1
15. Alcohol or drug paraphernalia	0	1
16. Busy traffic 0	1	
17. Adults/teens observing children	0	1
18. Adults/teens hanging out (not family)	0	1
19. Safe play area (e.g. yard)	0	1

20. Was there anything else you saw inside or outside that could be dangerous for the children?

0 No
1 Yes:_____

21. How warm were the observed interactions between the mother and her children?

1 cold, distant, unfriendly
2 reserved
3 average
4 somewhat warm and positive
5 warm, positive, affectionate

22. How warm were the observed interactions between the father and his children?

1 cold, distant, unfriendly
2 reserved
3 average
4 somewhat warm and positive
5 warm, positive, affectionate

23. Based on what the mother and children said and what you observed while in the house, rate the mother's relationships with her children.

1 hostile, very negative
2 slightly negative
3 average
4 good for the most part
5 warm, positive, almost ideal

24. Based on what the father and children said and what you observed while in the house, rate the father's relationships with his children.

1 hostile, very negative
2 slightly negative
3 average
4 good for the most part
5 warm, positive, almost ideal

25. How much did the mother yell or raise her voice with her children?

1 none at all
2 a little
3 some
4 more than average
5 a lot

26. How much did the father yell or raise his voice with his children?

1 none at all
2 a little
3 some
4 more than average
5 a lot

27. How well did the mother seem to know her children?

1 not very well
2 not as well as most mothers
3 about as well as most mothers
4 better than most mothers
5 very well

28. How well did the father seem to know his children?

1 not very well
2 not as well as most fathers
3 about as well as most fathers
4 better than most fathers
5 very well

29. How much joy did the mother seem to experience in the parenting role?

1 none at all
2 a little
3 some
4 more than average
5 a lot

30. How much joy did the father seem to experience in the parenting role?

1 none at all
2 a little
3 some
4 more than average
5 a lot

31. Was there any reason to doubt the validity of the mother's responses?

0 No
1 Yes: Why? _____

32. Was there any reason to doubt the validity of the father's responses?

0 No
1 Yes: Why? _____

33. Was there any reason to doubt the validity of Kiddie1's responses?

0 No
1 Yes: Why? _____

34. Was there any reason to doubt the validity of Kiddie2's responses?

0 No
1 Yes: Why? _____

Appendix D: CQ

«Child_1_Name»'s In-Home Math Questionnaire (Part 1)

GRADES

Circle the letter/word that best describes your academic performance in the following subjects since the start of the school year.

	A/ Excellent	*B/ Good*	*C/ Average*	*D/ Below Average*	*F / Fail*
Language Arts	1	2	3	4	5
Social Studies	1	2	3	4	5
Math	1	2	3	4	5
Science	1	2	3	4	5

About my Home

Please answer these questions about your home. Think about how things have been in the last 3 months and circle the number that best describes your feelings.

	Definitely UNTRUE	*Somewhat UNTRUE*	*Not really true or untrue*	*Somewhat TRUE*	*Definitely TRUE*
I have a regular bedtime routine (e.g., same bedtime each night, brushing teeth, reading a story).	**1**	**2**	**3**	**4**	**5**
You can't hear yourself think	**1**	**2**	**3**	**4**	**5**

in our home					
It's a real zoo in our home	**1**	**2**	**3**	**4**	**5**
We are usually able to stay on top of things	**1**	**2**	**3**	**4**	**5**
There is usually a television turned on somewhere in our home	**1**	**2**	**3**	**4**	**5**
The atmosphere in our house is calm	**1**	**2**	**3**	**4**	**5**

MY PARENTS

Circle the word that best describes your response to these situations.

What do you think is usually true or usually false about your father [stepfather/male guardian]?		
	Usually True	*Usually False*
I can count on him to help me out, if I have some kind of problem.	1	2
He keeps pushing me to do my best in whatever I do.	1	2
He keeps pushing me to think independently.	1	2
He helps me with my school work if there is something I don't understand.	1	2
When he wants me to do something he explains why.	1	2
What do you think is usually true or usually false about your mother [stepmother/female guardian]?		
	Usually True	*Usually False*
I can count on her to help me out, if I have some kind of problem.	1	2
She keeps pushing me to do my best in whatever I do.	1	2
She keeps pushing me to think independently.	1	2

She helps me with my school work if there is something I don't understand.	1	2
When she wants me to do something she explains why.	1	2

Circle the response that gives your best explanation to these questions.

1. When you get a poor grade in school, how often do your parents or guardians encourage you to try harder?
   1 = Never 2 = Sometimes 3 = Usually
2. When you get a good grade in school, how often do your parents or guardians praise you?
   1 = Never 2 = Sometimes 3 = Usually
3. How much do your parents really know who your friends are?
   1 = Don't know 2 = Know a little 3 = Know a lot

4. How often do these things happen in your family?
   a) My parents spend time just talking with me

      1 = Almost every day 2 = A few times a week

      3 = A few times a month 4 = Almost never

   b) My family does something fun together

      1 = Almost every day 2 = A few times a week

      3 = A few times a month 4 = Almost never

5. In a typical week, what is the latest you can stay out on SCHOOL NIGHTS (Monday-Thursday)?
   1 = Not allowed out 2 = Before 8:00 3 = 8:00 to 8:59 4 = 9:00 to 9:59

   5 = 10:00 to 10:59 6 = 11:00 or later 7= As late as I want

6. In a typical week, what is the latest you can stay out on FRIDAY OR SATURDAY NIGHT?
   1 = Not allowed out 2 = Before 9:00 3 = 9:00 to 9:59 4 = 10:00 to 10:59

   5 = 11:00 to 11:59 6 = 12:00 to 12:59 7= 1:00 to 1:59 8 = After 2:00

   9 = As late as I want

7. My Parents know exactly where I am most afternoons after school.
   1 = Yes

   2 = No

Please circle the response that best fits you.

How much do your parents TRY to know…			
	Don't try	*Try a little*	*Try a lot*
Where you go at night?	1	2	3
What you do with your free time?	1	2	3
Where you are most afternoons after school?	1	2	3
How much do your parents REALLY know…			
	Don't know	*Know a little*	*Know a lot*
Where you go at night?	1	2	3
What you do with your free time?	1	2	3
Where you are most afternoons after school?	1	2	3

How I feel About Math

The items below are about things that may bother you or cause you to be nervous or anxious or tense when you have to do them. Circle the answer which best shows how nervous or anxious or tense you would feel. Be sure to answer every question.

	Not at all nervous	*Not very nervous*	*Fairly nervous*	*Very nervous*	*Very, very nervous*
1. How nervous or tense would you feel if you had to solve this problem: *George brought 4 boxes of toy cars to class. If each box had 7 cars, how many cars did George bring?*	1	2	3	4	5
2. Mark how nervous or tense you would feel if you had to decide if this problem is right: $(3 + 4) + 2 = 4 + (2 + 3)$.	1	2	3	4	5
3. How nervous or tense would you feel reading this problem: *Babe Ruth was known as the Home Run King. He had 54 home runs in 1920, 59 in 1921, and his best of 80 in 1928. How many home runs did he hit in all three years?*	1	2	3	4	5

4. Mark how nervous you feel when you have to add 976 + 777 + 458 on paper.	1	2	3	4	5
5. If you had to add up a cash register receipt after you bought several things, how nervous would you feel?	1	2	3	4	5
6. When counting how much change you should get back after buying something, how nervous do you feel?	1	2	3	4	5
7. When getting your math book and seeing all the numbers in it, how nervous do you feel?	1	2	3	4	5
8. Getting called on by the teacher to do a math problem on the board (how nervous do you feel)?	1	2	3	4	5
9. Raising your hand in math class to ask a question about something you don't understand.	1	2	3	4	5
10. Looking at how much two different sizes of two different kinds of soft drinks cost and deciding which is cheaper.	1	2	3	4	5
11. Starting to read a hard new chapter for your math homework.	1	2	3	4	5
12. Being asked by your teacher to tell how you got your answer to a math problem.	1	2	3	4	5

	Not at all nervous	*Not very nervous*	*Fairly nervous*	*Very nervous*	*Very, very nervous*
13. Taking a big test in your math class.	1	2	3	4	5
14. Sitting down to do your math homework on things you are just starting to learn.	1	2	3	4	5
15. Thinking about a math test the night before the test.	1	2	3	4	5
16. Thinking about a math test an hour before the test.	1	2	3	4	5
17. Thinking about a math test 5 minutes before the test.	1	2	3	4	5
18. Waiting to get a math test back on which you think you didn't do very well.	1	2	3	4	5
19. Being given a set of multiplication problems to solve on paper.	1	2	3	4	5
20. Being given a set of division problems to solve	1	2	3	4	5

on paper.					
21. Having to figure out how much each of you owe when you buy a pizza and three soft drinks with two friends.	1	2	3	4	5
22. Counting your change after buying a movie ticket because you think you didn't get enough money back.	1	2	3	4	5
23. Figuring out what time it will be in 25 minutes.	1	2	3	4	5
24. Figuring out if you have enough money to buy a candy bar and soft drink.	1	2	3	4	5
25. Having someone watch you while you correct your math homework on the blackboard.	1	2	3	4	5
26. Listening as your teacher tries to help you understand how to do a math problem.	1	2	3	4	5

SIBLINGS

1. How many siblings do you have (including your twin)? _____

2. How many are older than you (NOT including your twin)? _____

School and Me

For each of the following reasons, circle the answer which suits you best, using the choice of answer on a scale of 1 to 5.

	Almost never for this reason	*Rarely for this reason*	*Generally for this reason*	*Often for this reason*	*Almost always for this reason*
Usually, I do my homework or school work					
… because I have chosen it myself	**1**	**2**	**3**	**4**	**5**
… I don't know why, I really don't see what difference it makes	**1**	**2**	**3**	**4**	**5**
… because it is what I am supposed to do	**1**	**2**	**3**	**4**	**5**
… for the pleasure of doing it	**1**	**2**	**3**	**4**	**5**
Usually, I go to school					

…	because I have chosen it myself	**1**	**2**	**3**	**4**	**5**
…	I don't know why, I really don't see what difference it makes	**1**	**2**	**3**	**4**	**5**
…	because it is what I am supposed to do	**1**	**2**	**3**	**4**	**5**
…	for the pleasure of doing it	**1**	**2**	**3**	**4**	**5**
Usually, I listen to the teacher						
…	because I have chosen it myself	**1**	**2**	**3**	**4**	**5**
…	I don't know why, I really don't see what difference it makes	**1**	**2**	**3**	**4**	**5**
…	because it is what I am supposed to do	**1**	**2**	**3**	**4**	**5**
…	for the pleasure of doing it	**1**	**2**	**3**	**4**	**5**

«Child_2_Name»'s Math Questionnaire (Part 2)

About Me

Please circle the number to tell us how often each of these things happens to you. There are no right or wrong answers.

	Never	*Sometimes*	*Often*	*Always*
I worry about things…	1	2	3	4
I am scared of the dark…	1	2	3	4
When I have a problem, I get a funny feeling in my stomach…	1	2	3	4
I feel afraid…	1	2	3	4
I would feel afraid of being on my own at home…	1	2	3	4
I feel scared when I have to take a test…	1	2	3	4
I feel afraid if I have to use public toilets or bathrooms…	1	2	3	4
I worry about being away from my parents…	1	2	3	4
I feel afraid that I will make a fool of myself in front of people…	1	2	3	4
I worry that I will do badly at my school work…	1	2	3	4
I am popular amongst other kids my own age…	1	2	3	4
I worry that something awful will happen to someone in my family…	1	2	3	4
I suddenly feel as if I can't breathe when there is no reason	1	2	3	4

for this…				
I have to keep checking that I have done things right (like the switch is off or the door is locked)…	1	2	3	4
I feel scared if I have to sleep on my own…	1	2	3	4
I have trouble going to school in the mornings because I feel nervous or afraid…	1	2	3	4
I am good at sports…	1	2	3	4
I am scared of dogs…	1	2	3	4
I can't seem to get bad or silly thoughts out of my head…	1	2	3	4
When I have a problem, my heart beats really fast…	1	2	3	4
I suddenly start to tremble or shake when there is no reason for this…	1	2	3	4
I worry that something bad will happen to me…	1	2	3	4
I am scared of going to the doctors or dentists…	1	2	3	4

	Never	*Sometimes*	*Often*	*Always*
When I have a problem, I feel shaky…	1	2	3	4
I am scared of being in high places or elevators…	1	2	3	4
I am a good person…	1	2	3	4
I have to think of special thoughts to stop bad things from happening (like numbers or words)…	1	2	3	4
I feel scared if I have to travel in the car, or on a bus or a train…	1	2	3	4
I worry what other people think of me…	1	2	3	4
I am afraid of being in crowded places (like shopping centers, the movies, buses, busy playgrounds)…	1	2	3	4
I feel happy…	1	2	3	4
All of a sudden I feel really scared for no reason at all…	1	2	3	4
I am scared of insects or spiders…	1	2	3	4
I suddenly become dizzy or faint when there is no reason for this…	1	2	3	4
I feel afraid if I have to talk in front of my class…	1	2	3	4
My heart suddenly starts to beat too quickly for no reason…	1	2	3	4
I worry that I will suddenly get a scared feeling when there	1	2	3	4

is nothing to be afraid of…				
I like myself…	1	2	3	4
I am afraid of being in small closed places, like tunnels or small rooms…	1	2	3	4
I have to do some things over and over again (like washing my hands, cleaning, or putting things in a certain order)…	1	2	3	4
I get bothered by bad or silly thoughts or pictures in my mind…	1	2	3	4
I have to do some things in just the right way to stop bad things from happening…	1	2	3	4
I am proud of my school work…	1	2	3	4
I would feel scared if I had to stay away from home overnight…	1	2	3	4

How I feel about School

Below are some questions about how you feel about school, especially math. Please read each item carefully and circle the number to tell us what best describes how YOU feel about school:

	Strongly Disagree	*Disagree*	*Agree*	*Strongly Agree*
When I do mathematics, I sometimes get totally absorbed	1	2	3	4
Mathematics is important to me personally	1	2	3	4
Because doing mathematics is fun, I wouldn't want to give it up	1	2	3	4
I am certain I can understand the most difficult material presented in readings.	1	2	3	4
I am confident I can do an excellent job on assignments and tests	1	2	3	4
I am certain I can master the skills being taught	1	2	3	4
I learn things quickly in most school subjects	1	2	3	4
I am good at most school subjects	1	2	3	4
I can do well in most school subjects	1	2	3	4

Problems at School

Please circle the number that best describes you.

	Strongly Disagree	*Disagree*	*Disagree Somewhat*	*Neither Agree nor Disagree*	*Agree Somewhat*	*Agree*	*Agree Strongly*
I'm good at dealing with setbacks	1	2	3	4	5	6	7
I don't let study stress get the best of me	1	2	3	4	5	6	7
I think I'm good at dealing with schoolwork pressures	1	2	3	4	5	6	7
I don't let a bad mark affect my confidence	1	2	3	4	5	6	7

Dealing with problems

Everyone has problems with schoolwork (e.g., bad grades, homework pressure) and with friends (e.g., falling out with friends, being bullied, being left out) sometimes. Everyone responds to these problems in his or her own way.

When you experience problems with schoolwork (e.g., doing badly in a test or exam, getting bad grades, too much homework, not understanding the teacher, having trouble keeping up in class), how do you generally think and feel?

Please circle the number that best describes your response.

		Never	*Rarely*	*Sometimes*	*Often*	*Very Often*
When I am having problems with schoolwork…						
…	I tell myself not to worry, everything will be ok	1	2	3	4	5
…	I keep thinking about how bad the problem is	1	2	3	4	5
…	I think about what needs to be done to make things better	1	2	3	4	5
…	I tell myself to be strong	1	2	3	4	5
…	I worry that I will always have these	1	2	3	4	5

	problems					
…	I think of different ways to solve the problem	1	2	3	4	5
…	I tell myself that things aren't so bad	1	2	3	4	5
…	I think that nothing helps	1	2	3	4	5
…	I figure out what I can do about it	1	2	3	4	5
…	I tell myself that things will be ok	1	2	3	4	5
…	I think that the problems will never go away	1	2	3	4	5
…	I try different ways to solve the problem	1	2	3	4	5
…	I worry too much about it	1	2	3	4	5
…	I tell myself that things could be worse	1	2	3	4	5
…	I ask other people (e.g., teacher, parents) for help or ideas about how to deal with the problem	1	2	3	4	5
…	I try to look on the bright side of things	1	2	3	4	5

When you experience problems with friends (e.g., being left out or rejected, being bullied, not having as many friends as you would like, fighting with other kids, losing your best friend), how do you generally think and feel?

Please circle the number that best describes your response.

		Never	*Rarely*	*Sometimes*	*Often*	*Very Often*
When I am having problems with friends…						
…	I tell myself not to worry, everything will be ok	1	2	3	4	5
…	I keep thinking about how bad the problem is	1	2	3	4	5
…	I think about what needs to be done to make things better	1	2	3	4	5
…	I tell myself to be strong	1	2	3	4	5
…	I worry that I will always have these problems	1	2	3	4	5

…	I think of different ways to solve the problem	1	2	3	4	5
…	I tell myself that things aren't so bad	1	2	3	4	5
…	I think that nothing helps	1	2	3	4	5
…	I figure out what I can do about it	1	2	3	4	5
…	I tell myself that things will be ok	1	2	3	4	5
…	I think that the problems will never go away	1	2	3	4	5
…	I try different ways to solve the problem	1	2	3	4	5
…	I worry too much about it	1	2	3	4	5
…	I tell myself that things could be worse	1	2	3	4	5
…	I ask other people (e.g., teacher, parents) for help or ideas about how to deal with the problem	1	2	3	4	5
…	I try to look on the bright side of things	1	2	3	4	5

Class Time

This set of questions is about how things work at your school. How true is it that your **MATH** teacher does the following:

	Not at All	*A little True*	*Somewhat True*	*Quite True*	*Very True*
1. Have students talk about their class work	1	2	3	4	5
2. Let students decide where to sit at the beginning of the school year	1	2	3	4	5
3. Allow students to choose their partners for group work	1	2	3	4	5
4. Ask for students' ideas	1	2	3	4	5
5. Let students help make school rules	1	2	3	4	5
6. Pay too much attention to grades and not enough attention to helping students learn	1	2	3	4	5

7. Only care about the smart kids in the class	1	2	3	4	5
8. Have given up on some of their students	1	2	3	4	5
9. Encourage students to compete against each other for grades	1	2	3	4	5
10. Give students credit for trying hard	1	2	3	4	5

What my School is like

These questions are about what your school is like. Circle the number that explains how true each statement is about your school.

	Not at All True	*Not Very True*	*Sort of True*	*Very True*
1. I work hard in school so I will be able to go to college.	1	2	3	4
2. I am happy to be at my school.	1	2	3	4
3. My teacher(s) treat me fairly.	1	2	3	4
4. I care what my teacher(s) think of me.	1	2	3	4
5. I wish I could drop out of school.	1	2	3	4
6. There are too many kids at my school.	1	2	3	4
7. I often take part in or attend school functions (like athletic events, plays or dances).	1	2	3	4
8. The teachers at my school treat students fairly.	1	2	3	4
9. I have too many different classes.	1	2	3	4
10. I feel close to others at my school.	1	2	3	4
11. There are too many kids that I don't know.	1	2	3	4
12. The work is too hard.	1	2	3	4
13. I feel safe at my school.	1	2	3	4
14. I feel lost at my school.	1	2	3	4

15. Teachers ask me to do things that I don't know how to do.	1	2	3	4
16. I feel very close to at least one of my teachers.	1	2	3	4
17. I feel proud of my school.	1	2	3	4
18. I take part in extracurricular activities (sports, clubs, interest groups) at my school.	1	2	3	4
19. I feel like I am a part of my school.	1	2	3	4

HOMEWORK ORGANIZATION

Below are some things that you might do when you do your homework. Circle the number that best describes how often you do these things:

When you do your homework, do you:	*Never*	*Hardly Ever*	*Sometimes*	*A lot*	*All the time*
1. Find a quiet area to work?	5	4	3	2	1
2. Clear off the desk or table where you do your homework?	5	4	3	2	1
3. Make enough room to work?	5	4	3	2	1
4. Turn off the TV when you do your homework?	5	4	3	2	1
5. Find an area where you can get help from others?	5	4	3	2	1
6. Set goals and make a plan?	5	4	3	2	1
7. Keep track of what is left to do?	5	4	3	2	1
8. Daydream while you do your homework?	5	4	3	2	1
9. Play around with other things while doing your homework?	5	4	3	2	1
10. Stop homework to watch your favorite TV show, to IM (use e-mail), to surf the Web, or to play?	5	4	3	2	1

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